

MINOR SOURCE OPERATING PERMIT OFFICE OF AIR QUALITY

**W.R. Grace and Co. - Conn.
5215 Kennedy Avenue
East Chicago, Indiana 46312**

(herein known as the Permittee) is hereby authorized to operate subject to the conditions contained herein, the emission units described in Section A (Source Summary) of this permit.

This permit is issued to the above mentioned company under the provisions of 326 IAC 2-1.1, 326 IAC 2-6.1 and 40 CFR 52.780, with conditions listed on the attached pages.

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| Operation Permit No.: MSOP 089-8847-00310 | |
| Issued by: Paul Dubenetzky, Branch Chief Office of Air Quality | Issuance Date: |

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SECTION A

SOURCE SUMMARY

This permit is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 and A.2 is descriptive information and does not constitute enforceable conditions. However, the Permittee should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Permittee to obtain additional permits or seek modification of this permit pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

A.1 General Information [326 IAC 2-5.1-3(c)] [326 IAC 2-6.1-4(a)]

The Permittee owns and operates a stationary a sodium silicate solution and Ludox manufacturing source.

Authorized Individual: Patricia M. Winkley
Source Address: 5215 Kennedy Avenue, East Chicago, Indiana 46312
Mailing Address: 5215 Kennedy Avenue, East Chicago, Indiana 46312
Phone Number: 219-391-4647
SIC Code: 2819
County Location: Lake
County Status: Nonattainment for PM₁₀, SO₂ and Ozone
Attainment area for all other criteria pollutants
Source Status: Minor Source Operating Permit
Minor Source, under PSD and Emission Offset Rules;
Minor Source, Section 112 of the Clean Air Act

A.2 Emissions Units and Pollution Control Equipment Summary

This stationary source is approved to operate the following emissions units and pollution control devices:

- (a) One (1) Sodium Silicate Furnace, known as EU-01, installed in 1902, exhausted through stack S/V 01, maximum capacity: 9,600 pounds of raw material per hour and 25 million British thermal units per hour.
- (b) Three (3) Stone Johnston Boilers, known as EU-02, EU-03 and EU-04, installed in March 1986, exhausted through stacks S/V 02, S/V03 and S/V04, respectively, maximum capacity: 26.46 million British thermal units per hour, each.
- (c) Emergency generators as follows:
 - (1) One (1) EVC backup generator, identified as EU-05, fired by natural gas, capacity: 0.5 million British thermal units per hour.
 - (2) One (1) Powerhouse backup generator, identified as EU-06, fired by natural gas, capacity: 0.5 million British thermal units per hour.
- (d) Lime transfer and storage operations, identified as EU-07, with a 400 cubic foot storage silo and handled by pneumatic transfer, equipped with a baghouse for particulate control, maximum throughput: 0.056 ton per hour.
- (e) Sand transfer and storage operations, identified as EU-08, with a 20,409 cubic foot storage silo and handled by a bucket elevator, equipped with filter bags for particulate control, maximum throughput: 4.2 tons per hour.

- (f) Soda Ash transfer and storage operations, identified as EU-09, with a 4,500 cubic foot storage silo and handled by pneumatic transfer, equipped with filter bags for particulate control, maximum throughput: 2.2 tons per hour.
- (g) Eight (8) sodium silicate solution storage tanks, identified as EU-10, containing only inorganic chemicals with negligible vapor pressures.
- (h) Nineteen (19) Ludox colloidal silica storage tanks, identified as EU-11, containing organic and inorganic chemicals with negligible vapor pressures.
- (i) The following tanks containing inorganic chemicals with negligible vapor pressures:
 - (1) One (1) aqua ammonia blowcase, identified as EU-12, installed in 1976, containing 29% aqua ammonia, capacity: 500 gallons.
 - (2) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-13, installed in 1973, capacity: 4,300 gallons.
 - (3) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-14, installed in 1963, capacity: 12,000 gallons.
 - (4) Three (3) spent regenerated acid tanks, identified as EU-15, installed in 1972, capacity: 33,000 gallons, each.
 - (5) One (1) fifty percent (50%) caustic storage tank, identified as EU-16, constructed in 1990, containing 50% sodium hydroxide, capacity: 25,000 gallons.
 - (6) One (1) fifty percent (50%) caustic storage tank, identified as EU-17, constructed in 1986, containing 50% sodium hydroxide, capacity: 4,000 gallons.
 - (7) One (1) boiler feed - oxygen scavenger, identified as EU-18, installed in 1994, capacity: 550 gallons.
 - (8) One (1) boiler feed - scale preventative, identified as EU-19, installed in 1994, capacity: 850 gallons.
- (j) The following tanks containing organic chemicals with negligible vapor pressures:
 - (1) One (1) solvent parts cold cleaner, identified as EU-20, installed in 1996, containing petroleum distillate and using only nonhalogenated solvents, capacity: 30 gallons.
 - (2) One (1) cationic polymer tank, identified as EU-21, installed in 1972, capacity: 4,000 gallons.
 - (3) One (1) gasoline storage tank, identified as EU-22, installed in 1991, capacity: 270 gallons.
 - (4) One (1) diesel storage tank, identified as EU-23, installed in 1991, capacity: 500 gallons.

SECTION B GENERAL CONDITIONS

THIS SECTION OF THE PERMIT IS BEING ISSUED UNDER THE PROVISIONS OF 326 IAC 2-1.1 AND 40 CFR 52.780, WITH CONDITIONS LISTED BELOW.

B.1 Permit No Defense [IC 13]

This permit to operate does not relieve the Permittee of the responsibility to comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder, as well as other applicable local, state, and federal requirements.

B.2 Definitions

Terms in this permit shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, any applicable definitions found in IC 13-11, 326 IAC 1-2, and 326 IAC 2-1.1-1 shall prevail.

B.3 Effective Date of the Permit [IC13-15-5-3]

Pursuant to IC 13-15-5-3, this permit becomes effective upon its issuance.

B.4 Modification to Permit [326 IAC 2]

All requirements and conditions of this operating permit shall remain in effect unless modified in a manner consistent with procedures established for modifications of operating permits pursuant to 326 IAC 2 (Permit Review Rules).

SECTION C SOURCE OPERATION CONDITIONS

| |
|---------------|
| Entire Source |
|---------------|

C.1 PSD, Emission Offset and Part 70 Minor Source Status [326 IAC 2-2] [40 CFR 52.21] [326 IAC 2-3] [326 IAC 2-7]

- (a) Any change or modification which may increase potential to emit of PM or CO to 100 tons per year from this source, shall cause this source to be considered a major source under PSD, 326 IAC 2-2 and 40 CFR 52.21, and shall require approval from IDEM, OAQ prior to making the change.
- (b) Any change or modification which may increase potential to emit of VOC to 25 tons per year, or PM₁₀, NO_x or SO₂ to 100 tons per year shall cause this source to be considered a major source pursuant to Emission Offset, 326 IAC 2-3, and shall require approval from IDEM, OAQ prior to making the change.
- (c) Any change or modification which may increase potential to emit of VOC to 25 tons per year, 10 tons per year of any single hazardous air pollutant, 25 tons per year of any combination of hazardous air pollutants, or 100 tons per year of any other regulated pollutant from this source, shall cause this source to be considered a major source under Part 70 Permit Program, 326 IAC 2-7, and shall require approval from IDEM, OAQ prior to making the change.

C.2 Preventive Maintenance Plan [326 IAC 1-6-3]

- (a) If required by specific condition(s) in Section D of this permit, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMP) after issuance of this permit, including the following information on each emissions unit:
 - (1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;
 - (2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions;
 - (3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.
- (b) The Permittee shall implement the Preventive Maintenance Plans as necessary to ensure that failure to implement the Preventive Maintenance Plan does not cause or contribute to a violation of any limitation on emissions or potential to emit.
- (c) PMP's shall be submitted to IDEM, OAQ, upon request and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ, may require the Permittee to revise its Preventive Maintenance Plan whenever lack of proper maintenance causes or contributes to any violation.

C.3 Permit Revision [326 IAC 2-5.1-3(e)(3)] [326 IAC 2-6.1-6]

- (a) The Permittee must comply with the requirements of 326 IAC 2-6.1-6 whenever the Permittee seeks to amend or modify this permit.
- (b) Any application requesting an amendment or modification of this permit shall be submitted to:

Indiana Department of Environmental Management
Permits Branch, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

Any such application should be certified by the "authorized individual" as defined by 326 IAC 2-1.1-1.

- (c) The Permittee shall notify the OAQ within thirty (30) calendar days of implementing a notice-only change. [326 IAC 2-6.1-6(d)]

C.4 Inspection and Entry [326 IAC 2-5.1-3(e)(4)(B)] [326 IAC 2-6.1-5(a)(4)]

Upon presentation of proper identification cards, credentials, and other documents as may be required by law, and subject to the Permittee's right under all applicable laws and regulations to assert that the information collected by the agency is confidential and entitled to be treated as such, the Permittee shall allow IDEM, OAQ, U.S. EPA, or an authorized representative to perform the following:

- (a) Enter upon the Permittee's premises where a source is located, or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- (c) Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;
- (d) Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with this permit or applicable requirements; and
- (e) Utilize any photographic, recording, testing, monitoring, or other equipment for the purpose of assuring compliance with this permit or applicable requirements.

C.5 Transfer of Ownership or Operation [326 IAC 2-6.1-6(d)(3)]

Pursuant to [326 IAC 2-6.1-6(d)(3)]:

- (a) In the event that ownership of this source is changed, the Permittee shall notify IDEM, OAQ, Permits Branch, within thirty (30) days of the change.
- (b) The written notification shall be sufficient to transfer the permit to the new owner by an notice-only change pursuant to 326 IAC 2-6.1-6(d)(3).
- (c) IDEM, OAQ, shall issue a revised permit.

The notification which shall be submitted by the Permittee does require the certification by the "authorized individual" as defined by 326 IAC 2-1.1-1.

C.6 Permit Revocation [326 IAC 2-1-9]

Pursuant to 326 IAC 2-1-9(a)(Revocation of Permits), this permit operate may be revoked for any of the following causes:

- (a) Violation of any conditions of this permit.

- (b) Failure to disclose all the relevant facts, or misrepresentation in obtaining this permit.
- (c) Changes in regulatory requirements that mandate either a temporary or permanent reduction of discharge of contaminants. However, the amendment of appropriate sections of this permit shall not require revocation of this permit.
- (d) Noncompliance with orders issued pursuant to 326 IAC 1-5 (Episode Alert Levels) to reduce emissions during an air pollution episode.
- (e) For any cause which establishes in the judgment of IDEM, the fact that continuance of this permit is not consistent with purposes of this article.

C.7 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary alternative opacity limitations), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of twenty percent (20%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor in a six (6) hour period.

C.8 Fugitive Dust Emissions [326 IAC 6-4]

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions). 326 IAC 6-4-2(4) is not federally enforceable.

C.9 Nonattainment area particulate limitations; Lake County particulate matter contingency measures [326 IAC 6-1-11.2]

This source shall comply with the requirements of 326 IAC 6-1-11.2 (Nonattainment area particulate limitations; Lake County particulate matter contingency measures).

Testing Requirements

C.10 Performance Testing [326 IAC 3-6] [326 IAC 2-1.1-11]

- (a) Compliance testing on new emissions units shall be conducted within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up, if specified in Section D of this approval. All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this permit, utilizing any applicable procedures and analysis methods specified in 40 CFR 51, 40 CFR 60, 40 CFR 61, 40 CFR 63, 40 CFR 75, or other procedures approved by IDEM, OAQ.

A test protocol, except as provided elsewhere in this permit, shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

no later than thirty-five (35) days prior to the intended test date. The Permittee shall submit a notice of the actual test date to the above address so that it is received at least two weeks prior to the test date.

- (b) All test reports must be received by IDEM, OAQ, within forty-five (45) days after the completion of the testing. An extension may be granted by the IDEM, OAQ, if the source submits to IDEM, OAQ, a reasonable written explanation within five (5) days prior to the end of the initial forty-five (45) day period.

The documentation submitted by the Permittee does not require certification by the "authorized individual" as defined by 326 IAC 2-1.1-1.

Compliance Monitoring Requirements

C.11 Monitoring Methods [326 IAC 3]

Any monitoring or testing required by Section D of this permit shall be performed according to the provisions of 326 IAC 3, 40 CFR 60, Appendix A, or other approved methods as specified in this permit.

C.12 Compliance Monitoring Plan - Failure to Take Response Steps [326 IAC 1-6]

- (a) The Permittee is required to implement a compliance monitoring plan to ensure that reasonable information is available to evaluate its continuous compliance with applicable requirements. This compliance monitoring plan is comprised of:
 - (1) This condition;
 - (2) The Compliance Determination Requirements in Section D of this permit;
 - (3) The Compliance Monitoring Requirements in Section D of this permit;
 - (4) The Record Keeping and Reporting Requirements in Section C (Monitoring Data Availability, General Record Keeping Requirements, and General Reporting Requirements) and in Section D of this permit; and
 - (5) A Compliance Response Plan (CRP) for each compliance monitoring condition of this permit. CRP's shall be submitted to IDEM, OAQ upon request and shall be subject to review and approval by IDEM, OAQ. The CRP shall be prepared within ninety (90) days after issuance of this permit by the Permittee and maintained on site, and is comprised of:
 - (A) Response steps that will be implemented in the event that compliance related information indicates that a response step is needed pursuant to the requirements of Section D of this permit; and
 - (B) A time schedule for taking such response steps including a schedule for devising additional response steps for situations that may not have been predicted.
- (b) For each compliance monitoring condition of this permit, appropriate response steps shall be taken when indicated by the provisions of that compliance monitoring condition. Failure to perform the actions detailed in the compliance monitoring conditions or failure to take the response steps within the time prescribed in the Compliance Response Plan, shall constitute a violation of the permit unless taking the response steps set forth in the Compliance

Response Plan would be unreasonable.

- (c) After investigating the reason for the excursion, the Permittee is excused from taking further response steps for any of the following reasons:
 - (1) The monitoring equipment malfunctioned, giving a false reading. This shall be an excuse from taking further response steps providing that prompt action was taken to correct the monitoring equipment.
 - (2) The Permittee has determined that the compliance monitoring parameters established in the permit conditions are technically inappropriate, has previously submitted a request for an administrative amendment to the permit, and such request has not been denied or;
 - (3) An automatic measurement was taken when the process was not operating; or
 - (4) The process has already returned to operating within "normal" parameters and no response steps are required.
- (d) Records shall be kept of all instances in which the compliance related information was not met and of all response steps taken.

C.13 Actions Related to Noncompliance Demonstrated by a Stack Test

- (a) When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall take appropriate corrective actions. The Permittee shall submit a description of these corrective actions to IDEM, OAQ, within thirty (30) days of receipt of the test results. The Permittee shall take appropriate action to minimize emissions from the affected emissions unit while the corrective actions are being implemented. IDEM, OAQ shall notify the Permittee within thirty (30) days, if the corrective actions taken are deficient. The Permittee shall submit a description of additional corrective actions taken to IDEM, OAQ within thirty (30) days of receipt of the notice of deficiency. IDEM, OAQ reserves the authority to use enforcement activities to resolve noncompliant stack tests.
- (b) A retest to demonstrate compliance shall be performed within one hundred twenty (120) days of receipt of the original test results. Should the Permittee demonstrate to IDEM, OAQ that retesting in one-hundred and twenty (120) days is not practicable, IDEM, OAQ may extend the retesting deadline. Failure of the second test to demonstrate compliance with the appropriate permit conditions may be grounds for immediate revocation of the permit to operate the affected emissions unit.

The documents submitted pursuant to this condition do not require the certification by the "authorized individual" as defined by 326 IAC 2-1.1-1.

Record Keeping and Reporting Requirements

C.14 Malfunctions Report [326 IAC 1-6-2]

Pursuant to 326 IAC 1-6-2 (Records; Notice of Malfunction):

- (a) A record of all malfunctions, including startups or shutdowns of any facility or emission control equipment, which result in violations of applicable air pollution control regulations or applicable emission limitations shall be kept and retained for a period of three (3) years and shall be made available to the Indiana Department of Environmental Management (IDEM),

Office of Air Quality (OAQ) or appointed representative upon request.

- (b) When a malfunction of any facility or emission control equipment occurs which lasts more than one (1) hour, said condition shall be reported to OAQ, using the Malfunction Report Forms (2 pages). Notification shall be made by telephone or facsimile, as soon as practicable, but in no event later than four (4) daytime business hours after the beginning of said occurrence.
- (c) Failure to report a malfunction of any emission control equipment shall constitute a violation of 326 IAC 1-6, and any other applicable rules. Information of the scope and expected duration of the malfunction shall be provided, including the items specified in 326 IAC 1-6-2(a) (1) through (6).
- (d) Malfunction is defined as any sudden, unavoidable failure of any air pollution control equipment, process, or combustion or process equipment to operate in a normal and usual manner. [326 IAC 1-2-39]

C.15 Annual Emission Statement [326 IAC 2-6]

- (a) The Permittee shall submit an annual emission statement certified pursuant to the requirements of 326 IAC 2-6, that must be received by April 15 of each year and must comply with the minimum requirements specified in 326 IAC 2-6-4. The annual emission statement shall meet the following requirements:
 - (1) Indicate actual emissions of criteria pollutants from the source, in compliance with 326 IAC 2-6 (Emission Reporting);
 - (2) Indicate actual emissions of other regulated pollutants from the source, for purposes of Part 70 fee assessment.
- (b) The annual emission statement covers the twelve (12) consecutive month time period starting December 1 and ending November 30. The annual emission statement must be submitted to:

Indiana Department of Environmental Management
Technical Support and Modeling Section, Office of Air Quality
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015
- (c) The annual emission statement required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ, on or before the date it is due.

The submittal by the Permittee does require the certification by the "authorized individual" as defined by 326 IAC 2-1.1-1.

C.16 Monitoring Data Availability [326 IAC 2-6.1-2] [IC 13-14-1-13]

- (a) With the exception of performance tests conducted in accordance with Section C- Performance Testing, all observations, sampling, maintenance procedures, and record keeping, required as a condition of this permit shall be performed at all times the equipment is operating at normal representative conditions.

- (b) As an alternative to the observations, sampling, maintenance procedures, and record keeping of subsection (a) above, when the equipment listed in Section D of this permit is not operating, the Permittee shall either record the fact that the equipment is shut down or perform the observations, sampling, maintenance procedures, and record keeping that would otherwise be required by this permit.
- (c) If the equipment is operating but abnormal conditions prevail, additional observations and sampling should be taken with a record made of the nature of the abnormality.
- (d) If for reasons beyond its control, the operator fails to make required observations, sampling, maintenance procedures, or record keeping, reasons for this must be recorded.
- (e) At its discretion, IDEM may excuse such failure providing adequate justification is documented and such failures do not exceed five percent (5%) of the operating time in any quarter.
- (f) Temporary, unscheduled unavailability of staff qualified to perform the required observations, sampling, maintenance procedures, or record keeping shall be considered a valid reason for failure to perform the requirements stated in (a) above.

C.17 General Record Keeping Requirements [326 IAC 2-6.1-2]

- (a) Records of all required monitoring data and support information shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. These records shall be kept at the source location for a minimum of three (3) years and available upon the request of an IDEM, OAQ, representative. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a written request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.
- (b) Records of required monitoring information shall include, where applicable:
 - (1) The date, place, and time of sampling or measurements;
 - (2) The dates analyses were performed;
 - (3) The company or entity performing the analyses;
 - (4) The analytic techniques or methods used;
 - (5) The results of such analyses; and
 - (6) The operating conditions existing at the time of sampling or measurement.
- (c) Support information shall include, where applicable:
 - (1) Copies of all reports required by this permit;
 - (2) All original strip chart recordings for continuous monitoring instrumentation;
 - (3) All calibration and maintenance records;
 - (4) Records of preventive maintenance shall be sufficient to demonstrate that failure to implement the Preventive Maintenance Plan did not cause or contribute to a

violation of any limitation on emissions or potential to emit. To be relied upon subsequent to any such violation, these records may include, but are not limited to: work orders, parts inventories, and operator's standard operating procedures. Records of response steps taken shall indicate whether the response steps were performed in accordance with the Compliance Response Plan required by Section C - Compliance Monitoring Plan - Failure to take Response Steps, of this permit, and whether a deviation from a permit condition was reported. All records shall briefly describe what maintenance and response steps were taken and indicate who performed the tasks.

- (d) All record keeping requirements not already legally required shall be implemented when operation begins.

C.18 General Reporting Requirements [326 IAC 2-1.1-11] [326 IAC 2-6.1-2] [IC 13-14-1-13]

- (a) Unless otherwise specified in this permit, any notice, report, or other submission required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ, on or before the date it is due.
- (b) Unless otherwise specified in this permit, any semi-annual report shall be submitted within thirty (30) days of the end of the reporting period. The reports do not require the certification by the "authorized individual" as defined by 326 IAC 2-1.1-1(1).
- (c) All instances of deviations must be clearly identified in such reports. A reportable deviation is an exceedance of a permit limitation or a failure to comply with a requirement of the permit or a rule. It does not include:
 - (1) An excursion from compliance monitoring parameters as identified in Section D of this permit unless tied to an applicable rule or limit; or
 - (2) A malfunction as described in 326 IAC 1-6-2; or
 - (3) Failure to implement elements of the Preventive Maintenance Plan unless lack of maintenance has caused or contributed to a deviation.
 - (4) Failure to make or record information required by the compliance monitoring provisions of Section D unless such failure exceeds 5% of the required data in any calendar quarter.

A Permittee's failure to take the appropriate response step when an excursion of a compliance monitoring parameter has occurred or failure to monitor or record the required compliance monitoring is a deviation.

- (d) Any corrective actions or response steps taken as a result of each deviation must be clearly identified in such reports.
- (e) The first report shall cover the period commencing on the date of issuance of this permit and ending on the last day of the reporting period.

C.19 Annual Notification [326 IAC 2-6.1-5(a)(5)]

- (a) Annual notification shall be submitted to the Office of Air Quality stating whether or not the source is in operation and in compliance with the terms and conditions contained in this

permit.

- (b) Noncompliance with any condition must be specifically identified. If there are any permit conditions or requirements for which the source is not in compliance at any time during the year, the Permittee must provide a narrative description of how the source did or will achieve compliance and the date compliance was, or will be, achieved. The notification must be signed by an authorized individual.
- (c) The annual notice shall cover the time period from January 1 to December 31 of the previous year, and shall be submitted in the format attached no later than March 1 of each year to:

Compliance Data Section, Office of Air Quality
Indiana Department of Environmental Management
100 North Senate Avenue, P.O. Box 6015
Indianapolis, IN 46206-6015
- (d) The notification shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ, on or before the date it is due.

SECTION D.1 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (a) One (1) Sodium Silicate Furnace, known as EU-01, installed in 1902, exhausted through stack S/V 01, maximum capacity: 9,600 pounds of raw material per hour and 25 million British thermal units per hour.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-6.1-5(1)]

D.1.1 Particulate Matter Limitation (PM₁₀) [326 IAC 6-1-10.1]

- (a) Pursuant to 326 IAC 6-1-10.1(d) (Nonattainment area particulate limitations: Lake County PM₁₀ emission requirements), the one (1) Sodium Silicate Furnace, known as EU-01, shall limit PM₁₀ emissions to 1.439 pounds per ton and 6.0 pounds per hour.
- (b) Pursuant to 326 IAC 6-1-10.1(l), a continuous compliance plan (CCP) was submitted for the sodium silicate furnace on December 10, 1993. The CCP shall meet the requirements of 326 IAC 6-1-10.1(m) and (n). The source shall also comply with the requirements of 326 IAC 6-1-10.1(s), (t), (u) and (v), which outline the requirements for maintaining the CCP and complying with this rule.

D.1.2 Sulfur Dioxide Emission Limitations (SO₂) [326 IAC 7-4-1.1]

The one (1) Sodium Silicate Furnace shall only burn natural gas as fuel. Therefore, the facility will comply with the requirements of 326 IAC 7-4-1.1 (Sulfur Dioxide Emission Limitations: Lake County).

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.1.3 Testing Requirements [326 IAC 3-6]

- (a) During the period between 30 and 36 months after issuance of this permit, in order to demonstrate compliance with Condition D.1.1(a), the Permittee shall perform PM₁₀ testing utilizing methods as approved by the Commissioner. This test shall be repeated at least once every five (5) years from the date of this valid compliance demonstration. PM₁₀ includes filterable and condensable PM₁₀. Testing shall be conducted in accordance with Section C- Performance Testing.
- (b) During the period between 30 and 36 months after issuance of this permit, in order to demonstrate compliance with Condition C.1(b) and C.1(c), the Permittee shall perform NO_x testing to verify that the NO_x emission rate of the furnace is no more than 100 pounds per million cubic feet of natural gas input, utilizing methods as approved by the Commissioner. Testing shall be conducted in accordance with Section C- Performance Testing.
- (c) If the emission factor determined in the NO_x stack test is greater than 100 pounds per million cubic feet of natural gas input, the Permittee shall be required to use that emission factor to compute emissions, and if that emission factor results in a potential to emit NO_x greater than 100 tons per year from the entire source, the Permittee shall submit a Part 70 application pursuant to 326 IAC 2-7, or a FESOP application pursuant to 326 IAC 2-8, within one (1) year of completion of a valid stack test.

SECTION D.2 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (b) Three (3) Stone Johnston Boilers, known as EU-02, EU-03 and EU-04, installed in March 1986, exhausted through stacks S/V 02, S/V03 and S/V04, respectively, maximum capacity: 26.46 million British thermal units per hour, each.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-6.1-5(1)]

D.2.1 Particulate Matter Limitation (PM) [326 IAC 6-1-10.1]

Pursuant to 326 IAC 6-1-10.1(h), the three (3) Stone Johnston boilers in the Powerhouse shall fire natural gas only. Each boiler has PM emissions of 0.050 pounds per hour and PM₁₀ emissions of 0.201 pounds per hour according to the current AP-42 emission factors.

D.2.2 Sulfur Dioxide Emission Limitations (SO₂) [326 IAC 7-4-1.1]

The three (3) Stone Johnston boilers shall only burn natural gas as fuel. Therefore, the facilities will comply with the requirements of 326 IAC 7-4-1.1 (Sulfur Dioxide Emission Limitations: Lake County).

Record Keeping and Reporting Requirements [326 IAC 2-5.1-3(e)(2)] [326 IAC 2-6.1-5(a)(2)]

D.2.3 Reporting Requirements

The natural gas fired boiler certification, shall be submitted to the address listed in Section C - General Reporting Requirements, using the reporting forms located at the end of this permit, or their equivalent, within thirty (30) days after the end of the six (6) month period being reported.

SECTION D.3 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

(c) Emergency generators as follows:

- (1) One (1) EVC backup generator, identified as EU-05, fired by natural gas, capacity: 0.5 million British thermal units per hour.
- (2) One (1) Powerhouse backup generator, identified as EU-06, fired by natural gas, capacity: 0.5 million British thermal units per hour.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-6.1-5(1)]**D.3.1 Particulate Matter Limitation (PM) [326 IAC 6-1-2]**

Pursuant to 326 IAC 6-1-2, the PM from the power house backup generator shall not exceed 0.03 grain per dry standard cubic foot.

D.3.2 Particulate Matter Limitation (PM) [326 IAC 6-1-2]

Pursuant to 326 IAC 6-1-2, the PM from the one (1) EVC backup generator shall not exceed 0.03 grain per dry standard cubic foot.

D.3.3 Sulfur Dioxide Emission Limitations (SO₂) [326 IAC 7-4-1.1]

The two (2) backup generators shall only burn natural gas as fuel. Therefore, the facilities will comply with the requirements of 326 IAC 7-4-1.1 (Sulfur Dioxide Emission Limitations: Lake County).

SECTION D.4 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (d) Lime transfer and storage operations, identified as EU-07, with a 400 cubic foot storage silo and handled by pneumatic transfer, equipped with a baghouse for particulate control, maximum throughput: 0.056 ton per hour.
- (e) Sand transfer and storage operations, identified as EU-08, with a 20,409 cubic foot storage silo and handled by a bucket elevator, equipped with filter bags for particulate control, maximum throughput: 4.2 tons per hour.
- (f) Soda Ash transfer and storage operations, identified as EU-09, with a 4,500 cubic foot storage silo and handled by pneumatic transfer, equipped with filter bags for particulate control, maximum throughput: 2.2 tons per hour.
- (g) Eight (8) sodium silicate solution storage tanks, identified as EU-10, containing only inorganic chemicals with negligible vapor pressures.
- (h) Nineteen (19) Ludox colloidal silica storage tanks, identified as EU-11, containing organic and inorganic chemicals with negligible vapor pressures.
- (i) The following storage tanks containing inorganic chemicals with negligible vapor pressures:
 - (1) One (1) aqua ammonia blowcase, identified as EU-12, installed in 1976, containing 29% aqua ammonia, capacity: 500 gallons.
 - (2) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-13, installed in 1973, capacity: 4,300 gallons.
 - (3) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-14, installed in 1963, capacity: 12,000 gallons.
 - (4) Three (3) spent regenerated acid tanks, identified as EU-15, installed in 1972, capacity: 33,000 gallons, each.
 - (5) One (1) fifty percent (50%) caustic storage tank, identified as EU-16, constructed in 1990, containing 50% sodium hydroxide, capacity: 25,000 gallons.
 - (6) One (1) fifty percent (50%) caustic storage tank, identified as EU-17, constructed in 1986, containing 50% sodium hydroxide, capacity: 4,000 gallons.
 - (7) One (1) boiler feed - oxygen scavenger, identified as EU-18, installed in 1994, capacity: 550 gallons.
 - (8) One (1) boiler feed - scale preventative, identified as EU-19, installed in 1994, capacity: 850 gallons.

SECTION D.4, Continued EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (j) The following storage tanks containing organic chemicals with negligible vapor pressures:
- (1) One (1) solvent parts cold cleaner, identified as EU-20, installed in 1996, containing petroleum distillate and using only nonhalogenated solvents, capacity: 30 gallons.
 - (2) One (1) cationic polymer tank, identified as EU-21, installed in 1972, capacity: 4,000 gallons.
 - (3) One (1) gasoline storage tank, identified as EU-22, installed in 1991, capacity: 270 gallons.
 - (4) One (1) diesel storage tank, identified as EU-23, installed in 1991, capacity: 500 gallons.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-6.1-5(1)]

D.4.1 Particulate Matter (PM) [326 IAC 6-1-2]

Pursuant to 326 IAC 6-1-2, the filters bags controlling the lime transfer and storage operations, identified as EU-07, sand transfer and storage operations, identified as EU-08, and soda ash transfer and storage operations, identified as EU-09, shall not allow or permit discharge to the atmosphere of any gases which contain PM in excess of 0.03 grain per dry standard cubic foot.

D.4.2 Fugitive Particulate Matter (PM) [326 IAC 5-1] [326 IAC 6-4]

The fugitive emissions from these facilities shall comply with the requirements of 326 IAC 5-1 and 326 IAC 6-4, as described in Section C of this permit.

D.4.3 Volatile Organic Compounds (VOC)

Pursuant to 326 IAC 8-3-2 (Cold Cleaner Operations), the owner or operator shall:

- (a) Equip the cleaner with a cover;
- (b) Equip the cleaner with a facility for draining cleaned parts;
- (c) Close the degreaser cover whenever parts are not being handled in the cleaner;
- (d) Drain cleaned parts for at least fifteen (15) seconds or until dripping ceases;
- (e) Provide a permanent, conspicuous label summarizing the operation requirements;
- (f) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, in such a manner that greater than twenty percent (20%) of the waste solvent (by weight) can evaporate into the atmosphere.

D.4.4 Volatile Organic Compounds (VOC)

- (a) Pursuant to 326 IAC 8-3-5(a) (Cold Cleaner Degreaser Operation and Control), the owner or operator of a cold cleaner degreaser facility without a remote solvent reservoir, constructed after January 1, 1990, shall ensure that the following control equipment requirements are met:

- (1) Equip the degreaser with a cover. The cover must be designed so that it can be easily operated with one (1) hand if:
 - (A) The solvent volatility is greater than two (2) kiloPascals (fifteen (15) millimeters of mercury or three-tenths (0.3) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF));
 - (B) The solvent is agitated; or
 - (C) The solvent is heated.
 - (2) Equip the degreaser with a facility for draining cleaned articles. If the solvent volatility is greater than four and three-tenths (4.3) kiloPascals (thirty-two (32) millimeters of mercury or six-tenths (0.6) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF)), then the drainage facility must be internal such that articles are enclosed under the cover while draining. The drainage facility may be external for applications where an internal type cannot fit into the cleaning system.
 - (3) Provide a permanent, conspicuous label which lists the operating requirements outlined in subsection (b).
 - (4) The solvent spray, if used, must be a solid, fluid stream and shall be applied at a pressure which does not cause excessive splashing.
 - (5) Equip the degreaser with one (1) of the following control devices if the solvent volatility is greater than four and three-tenths (4.3) kiloPascals (thirty-two (32) millimeters of mercury or six-tenths (0.6) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF)), or if the solvent is heated to a temperature greater than forty-eight and nine-tenths degrees Celsius (48.9EC) (one hundred twenty degrees Fahrenheit (120EF)):
 - (A) A freeboard that attains a freeboard ratio of seventy-five hundredths (0.75) or greater.
 - (B) A water cover when solvent is used is insoluble in, and heavier than, water.
 - (C) Other systems of demonstrated equivalent control such as a refrigerated chiller or carbon adsorption. Such systems shall be submitted to the U.S. EPA as a SIP revision.
- (b) Pursuant to 326 IAC 8-3-5(b) (Cold Cleaner Degreaser Operation and Control), the owner or operator of a cold cleaning facility shall ensure that the following operating requirements are met:
- (1) Close the cover whenever articles are not being handled in the degreaser.
 - (2) Drain cleaned articles for at least fifteen (15) seconds or until dripping ceases.
 - (3) Store waste solvent only in covered containers and prohibit the disposal or transfer of waste solvent in any manner in which greater than twenty percent (20%) of the waste solvent by weight could evaporate.

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION**

**MINOR SOURCE OPERATING PERMIT
NATURAL GAS FIRED BOILER CERTIFICATION**

Source Name: W.R. Grace and Co. - Conn.
Source Address: 5215 Kennedy Avenue, East Chicago, Indiana 46312
Mailing Address: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP No.: 089-8847-00310

| |
|---|
| 9 Natural Gas Only |
| 9 Alternate Fuel burned |
| From: _____ To: _____ |
| I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. |
| Signature: |
| Printed Name: |
| Title/Position: |
| Phone: |
| Date: |

Attach a signed certification to complete this report.

MALFUNCTION REPORT

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
FAX NUMBER - 317 233-5967**

**This form should only be used to report malfunctions applicable to Rule 326 IAC 1-6
and to qualify for the exemption under 326 IAC 1-6-4.**

THIS FACILITY MEETS THE APPLICABILITY REQUIREMENTS BECAUSE IT HAS POTENTIAL TO EMIT 25 TONS/YEAR PARTICULATE MATTER ?_____, 25 TONS/YEAR SULFUR DIOXIDE ?_____, 25 TONS/YEAR NITROGEN OXIDES ?_____, 25 TONS/YEAR VOC ?_____, 25 TONS/YEAR HYDROGEN SULFIDE ?_____, 25 TONS/YEAR TOTAL REDUCED SULFUR ?_____, 25 TONS/YEAR REDUCED SULFUR COMPOUNDS ?_____, 25 TONS/YEAR FLUORIDES ?_____, 100 TONS/YEAR CARBON MONOXIDE ?_____, 10 TONS/YEAR ANY SINGLE HAZARDOUS AIR POLLUTANT ?_____, 25 TONS/YEAR ANY COMBINATION HAZARDOUS AIR POLLUTANT ?_____, 1 TON/YEAR LEAD OR LEAD COMPOUNDS MEASURED AS ELEMENTAL LEAD ?_____, OR IS A SOURCE LISTED UNDER 326 IAC 2-5.1-3(2) ?_____. EMISSIONS FROM MALFUNCTIONING CONTROL EQUIPMENT OR PROCESS EQUIPMENT CAUSED EMISSIONS IN EXCESS OF APPLICABLE LIMITATION _____.

THIS MALFUNCTION RESULTED IN A VIOLATION OF: 326 IAC _____ OR, PERMIT CONDITION # _____ AND/OR PERMIT LIMIT OF _____

THIS INCIDENT MEETS THE DEFINITION OF 'MALFUNCTION' AS LISTED ON REVERSE SIDE ? Y N

THIS MALFUNCTION IS OR WILL BE LONGER THAN THE ONE (1) HOUR REPORTING REQUIREMENT ? Y N

COMPANY: _____ PHONE NO. : _____
LOCATION: (CITY AND COUNTY) _____
PERMIT NO. _____ AFS PLANT ID: _____ AFS POINT ID: _____ INSP: _____
CONTROL/PROCESS DEVICE WHICH MALFUNCTIONED AND REASON: _____

DATE/TIME MALFUNCTION STARTED: ____/____/20____ _____ AM / PM

ESTIMATED HOURS OF OPERATION WITH MALFUNCTION CONDITION: _____

DATE/TIME CONTROL EQUIPMENT BACK-IN SERVICE ____/____/20____ _____ AM / PM

TYPE OF POLLUTANTS EMITTED: TSP, PM-10, SO₂, VOC, OTHER: _____

ESTIMATED AMOUNT OF POLLUTANT EMITTED DURING MALFUNCTION: _____

MEASURES TAKEN TO MINIMIZE EMISSIONS: _____

REASONS WHY FACILITY CANNOT BE SHUTDOWN DURING REPAIRS:

CONTINUED OPERATION REQUIRED TO PROVIDE ESSENTIAL* SERVICES: _____

CONTINUED OPERATION NECESSARY TO PREVENT INJURY TO PERSONS: _____

CONTINUED OPERATION NECESSARY TO PREVENT SEVERE DAMAGE TO EQUIPMENT: _____

INTERIM CONTROL MEASURES: (IF APPLICABLE) _____

MALFUNCTION REPORTED BY: _____ TITLE: _____
(SIGNATURE IF FAXED)

MALFUNCTION RECORDED BY: _____ DATE: _____ TIME: _____

**Please note - This form should only be used to report malfunctions
applicable to Rule 326 IAC 1-6 and to qualify for
the exemption under 326 IAC 1-6-4.**

326 IAC 1-6-1 Applicability of rule

Sec. 1. This rule applies to the owner or operator of any facility required to obtain a permit under 326 IAC 2-5.1 or 326 IAC 2-6.1.

326 IAC 1-2-39 "Malfunction" definition

Sec. 39. Any sudden, unavoidable failure of any air pollution control equipment, process, or combustion or process equipment to operate in a normal and usual manner.

* **Essential services** are interpreted to mean those operations, such as, the providing of electricity by power plants. Continued operation solely for the economic benefit of the owner or operator shall not be sufficient reason why a facility cannot be shutdown during a control equipment shutdown.

If this item is checked on the front, please explain rationale:

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION**

**MINOR SOURCE OPERATING PERMIT
ANNUAL NOTIFICATION**

This form should be used to comply with the notification requirements under 326 IAC 2-6.1-5(a)(5).

| | |
|----------------------|------------------------------------|
| Company Name: | W.R. Grace and Co. - Conn. |
| Address: | 5215 Kennedy Avenue, |
| City: | East Chicago, Indiana 46312 |
| Phone #: | 609 - 540 - 3536 |
| MSOP #: | MSOP 089-8847-00310 |

I hereby certify that W.R. Grace and Co. - Conn. is ☒ still in operation.
☐ no longer in operation.

I hereby certify that W.R. Grace and Co. - Conn. is ☒ in compliance with the requirements of MSOP **089-8847-00310**.
☐ not in compliance with the requirements of MSOP **089-8847-00310**.

| |
|---------------------------------------|
| Authorized Individual (typed): |
| Title: |
| Signature: |
| Date: |

If there are any conditions or requirements for which the source is not in compliance, provide a narrative description of how the source did or will achieve compliance and the date compliance was, or will be achieved.

| |
|-----------------------|
| Noncompliance: |
| |
| |
| |
| |

Indiana Department of Environmental Management Office of Air Quality

Technical Support Document (TSD) for a Minor Source Operating Permit

Source Background and Description

| | |
|------------------------------|---|
| Source Name: | W.R. Grace and Co. - Conn. |
| Source Location: | 5215 Kennedy Avenue, East Chicago, Indiana 46312 |
| County: | Lake |
| SIC Code: | 2819 |
| Operation Permit No.: | MSOP 089-8847-00310 |
| Permit Reviewer: | CarrieAnn Ortolani |

The Office of Air Quality (OAQ) has reviewed an application from E. I. DuPont DeNemours and Company, Inc. relating to the construction and operation of a sodium silicate solution and Ludox manufacturing plant. A letter was received on July 7, 2000, indicating that ownership of the plant had been transferred to W.R. Grace and Co. - Conn.

Permitted Emission Units and Pollution Control Equipment

The source consists of the following permitted emission units and pollution control devices:

- (a) One (1) Sodium Silicate Furnace, known as EU-01, installed in 1902, exhausted through stack S/V 01, maximum capacity: 9,600 pounds of raw material per hour and 25 million British thermal units per hour.
- (b) Three (3) Stone Johnston Boilers, known as EU-02, EU-03 and EU-04, installed in March 1986, exhausted through stacks S/V 02, S/V03 and S/V04, respectively, maximum capacity: 26 million British thermal units per hour, each.

Unpermitted Emission Units and Pollution Control Equipment

The source also consists of the following unpermitted facilities/units. None of these emission units have required a construction or operation permit. All units listed were exempt from permitting rules.

- (c) Emergency generators as follows:
 - (1) One (1) EVC backup generator, identified as EU-05, fired by natural gas, capacity: 0.5 million British thermal units per hour.
 - (2) One (1) Powerhouse backup generator, identified as EU-06, fired by natural gas, capacity: 0.5 million British thermal units per hour.
- (d) Lime transfer and storage operations, identified as EU-07, with a 400 cubic foot storage silo and handled by pneumatic transfer, equipped with a baghouse for particulate control, maximum throughput: 0.056 ton per hour.

- (e) Sand transfer and storage operations, identified as EU-08, with a 20,409 cubic foot storage silo and handled by a bucket elevator, equipped with filter bags for particulate control, maximum throughput: 4.2 tons per hour.
- (f) Soda Ash transfer and storage operations, identified as EU-09, with a 4,500 cubic foot storage silo and handled by pneumatic transfer, equipped with filter bags for particulate control, maximum throughput: 2.2 tons per hour.
- (g) Eight (8) sodium silicate solution storage tanks, identified as EU-10, containing only inorganic chemicals with negligible vapor pressures.
- (h) Nineteen (19) Ludox colloidal silica storage tanks, identified as EU-11, containing organic and inorganic chemicals with negligible vapor pressures.
- (i) The following tanks containing inorganic chemicals with negligible vapor pressures:
 - (1) One (1) aqua ammonia blowcase, identified as EU-12, installed in 1976, containing 29% aqua ammonia, capacity: 500 gallons.
 - (2) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-13, installed in 1973, capacity: 4,300 gallons.
 - (3) One (1) ninety-three percent (93%) sulfuric acid storage tank, identified as EU-14, installed in 1963, capacity: 12,000 gallons.
 - (4) Three (3) spent regenerated acid tanks, identified as EU-15, installed in 1972, capacity: 33,000 gallons, each.
 - (5) One (1) fifty percent (50%) caustic storage tank, identified as EU-16, constructed in 1990, containing 50% sodium hydroxide, capacity: 25,000 gallons.
 - (6) One (1) fifty percent (50%) caustic storage tank, identified as EU-17, constructed in 1986, containing 50% sodium hydroxide, capacity: 4,000 gallons.
 - (7) One (1) boiler feed - oxygen scavenger, identified as EU-18, installed in 1994, capacity: 550 gallons.
 - (8) One (1) boiler feed - scale preventative, identified as EU-19, installed in 1994, capacity: 850 gallons.
- (j) The following tanks containing organic chemicals with negligible vapor pressures:
 - (1) One (1) solvent parts cold cleaner, identified as EU-20, installed in 1996, containing petroleum distillate and using only nonhalogenated solvents, capacity: 30 gallons.
 - (2) One (1) cationic polymer tank, identified as EU-21, installed in 1972, capacity: 4,000 gallons.
 - (3) One (1) gasoline storage tank, identified as EU-22, installed in 1991, capacity: 270 gallons.
 - (4) One (1) diesel storage tank, identified as EU-23, installed in 1991, capacity: 500 gallons.

New Emission Units and Pollution Control Equipment

There are no proposed new facilities at this source.

Existing Approvals

The source has been operating under previous approvals including, but not limited to, the following:

- (a) OP 45-01-93-0472, issued on October 8, 1989; and
- (b) OP 45-01-93-0473, issued on October 8, 1989.

All conditions from previous approvals were incorporated into this permit.

Stack Summary

| Stack ID | Operation | Height (feet) | Diameter (feet) | Flow Rate (acfm) | Temperature (EF) |
|----------|------------------------------------|------------------|--------------------|---------------------|---------------------|
| 01 | Sodium Silicate Furnace (EU-01) | 47.58 | 5.16 | 52,710 | 260 |
| 02 | Stone Johnston Boiler (EU-02) | 31.5 | 2.08 | 6,520 | 381 |
| 03 | Stone Johnston Boiler (EU-03) | 31.5 | 2.08 | 6,520 | 381 |
| 04 | Stone Johnston Boiler (EU-04) | 31.5 | 2.08 | 6,520 | 381 |

Enforcement Issue

There are no enforcement actions pending. The unpermitted facilities did not require permits because they were exempt according to the 326 IAC 2 rules in effect on the dates of construction and operation. In 1992, changes were made to the furnace. These changes included routine maintenance of the bricks and the replacement of natural gas burners with more efficient ones. There were no increases in emissions and no increase in capacity. Therefore, the changes did not require IDEM, OAQ, approval.

Recommendation

The staff recommends to the Commissioner that the operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on August 6, 1997, with additional information received on November 22, 1999, January 31, 2000, November 3, 2000, and January 22, 2001.

Emission Calculations

See Appendix A of this document for detailed emissions calculations (pages 1 through 8 of 8).

The following tanks storage calculations were submitted by the applicant have been verified and found to be accurate and correct:

Total emissions for Storage tanks EU-12 through EU-19 = 0.000002 tons per year of PM

Total emissions for Storage tanks EU-20 through EU-23 = 0.064 tons per year of VOC

Emissions for Truck Unloading for Sulfuric Acid = 0.0000018 tons per year of Sulfuric Acid mist (PM)

Potential To Emit

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as “the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency.”

| Pollutant | Potential To Emit (tons/year) |
|------------------|----------------------------------|
| PM | 21.3 |
| PM ₁₀ | 22.7 |
| SO ₂ | 0.274 |
| VOC | 2.67 |
| CO | 38.3 |
| NO _x | 45.6 |

| HAPs | Potential To Emit (tons/year) |
|-----------------|----------------------------------|
| Benzene | 0.001 |
| Dichlorobenzene | 0.0005 |
| Formaldehyde | 0.068 |
| Hexane | 0.820 |
| Toluene | 0.002 |
| Lead | 0.0002 |
| Cadmium | 0.0005 |
| Chromium | 0.0006 |
| Manganese | 0.0002 |
| Nickel | 0.0003 |
| Ethylene Glycol | 0.062 |
| TOTAL | 0.955 |

- (a) The potential to emit (as defined in 326 IAC 2-1.1-1(16)) of NO_x is equal to or greater than 25 tons per year. Therefore, the source is subject to the provisions of 326 IAC 2-6.1.
- (b) The potentials to emit (as defined in 326 IAC 2-7-1(29)) of SO₂, CO, PM₁₀ and NO_x are less than 100 tons per year and the potential to emit of VOC is less than 25 tons per year in East Chicago, Lake County. Therefore, the source is not subject to the provisions of 326 IAC 2-7.
- (c) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is less than ten (10) tons per year and the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination HAPs is less than twenty-five (25) tons per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.

Limited Potential to Emit

The table below summarizes the total potential to emit, reflecting all limits, of the significant emission units.

| | Potential to Emit (tons/year) | | | | | | |
|--|----------------------------------|------------------|-----------------|-------|-------|-----------------|------------|
| Process/facility | PM | PM ₁₀ | SO ₂ | VOC | CO | NO _x | HAPS |
| Three (3) Stone Johnston Boilers | 0.649 | 2.60 | 0.205 | 1.88 | 28.7 | 34.2 | 0.206 |
| One (1) Furnace | 16.3 | 16.2 | 0.066 | 0.602 | 9.20 | 11.0 | 0.645 |
| Two (2) Backup Generators | 0.008 | 0.033 | 0.003 | 0.024 | 0.368 | 0.438 | 0.008 |
| Lime, Sand and Soda Ash Storage and Handling | 0.571 | 0.068 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sodium Silicate and Ludox storage and handling | 3.80 | 3.80 | 0.00 | 0.096 | 0.00 | 0.00 | 0.096 |
| Inorganic Storage Tanks | 0.000002 | 0.000002 | 0.00 | 0.00 | 0.00 | 0.00 | negligible |
| Organic Storage Tanks | 0.00 | 0.00 | 0.00 | 0.064 | 0.00 | 0.00 | negligible |
| Total Emissions | 21.3 | 22.7 | 0.274 | 2.67 | 38.3 | 45.6 | 0.955 |

- (a) This existing source is **not** a major stationary source because, although this is one of the 28 listed source categories, no pollutant is emitted at a rate of one hundred (100) tons per year or greater, and the VOC and Lead emissions are less than 25 tons per year. Therefore, pursuant to 326 IAC 2-2 and 2-3, and 40 CFR 52.21, the PSD and Emission Offset requirements do not apply.

(b) Fugitive Emissions

Since this type of operation is one of the 28 listed source categories (chemical processing) under 326 IAC 2-2, 40 CFR 52.21, or 326 IAC 2-3, the fugitive particulate matter (PM) and volatile organic compound (VOC) emissions are counted toward determination of PSD and Emission Offset applicability.

County Attainment Status

The source is located in Lake County.

| Pollutant | Status |
|------------------|----------------------|
| PM ₁₀ | nonattainment |
| SO ₂ | nonattainment |
| NO ₂ | attainment |
| Ozone | severe nonattainment |
| CO | attainment |
| Lead | attainment |

(a) Volatile organic compounds (VOC) and oxides of nitrogen are precursors for the formation of ozone. Therefore, VOC and NO_x emissions are considered when evaluating the rule applicability relating to the ozone standards. Lake County has been designated as severe nonattainment for ozone. Therefore, VOC and NO_x emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

(b) This portion of Lake County has been classified as nonattainment for SO₂ and PM₁₀. Therefore, these emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source, including the emissions from OP 45-01-93-0472 and OP 45-01-93-0473, both issued on October 8, 1989, is still not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

- (a) CO, NO_x, PM₁₀ and SO₂ are less than 100 tons per year,
- (b) VOC is less than 25 tons per year,
- (c) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
- (d) any combination of HAPS is less than 25 tons per year.

This status is based on all the air approvals issued to the source. This status has been verified by the OAQ inspector assigned to the source.

Federal Rule Applicability

- (a) This source is not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60.290, Subpart CC, Standards of Performance for Glass Manufacturing Plants) because the plant is not a glass manufacturing plant. The molten material produced is immediately cooled, solidified, and redissolved in a high pressure autoclave to manufacture Sodium Silicate Solution. The Sodium Silicate Furnace, EU-02, is not subject to 40 CFR 60, Subpart CC - Standards of Performance for Glass Manufacturing Plants for the following reasons:
- (1) The definition for a glass melting furnace, per 40 CFR 60.291, includes refining and conditioning. Molten sodium silicate is not refined or conditioned in this furnace.
 - (2) The operating temperature in this sodium silicate furnace is 2,000-3,000EF, which is less than the operating temperature in a glass manufacturing furnace. The firing capacity required by a sodium silicate furnace is lower, therefore the particulate emissions generated will be lower than those generated in a glass furnace.
 - (3) The production of sodium silicate is specifically categorized under the Standard Industrial Classification (SIC) code 2819, Industrial Inorganic Chemicals not elsewhere classified. SIC code 2819 is not listed in Subpart CC. The SIC codes which are listed in Subpart CC include:
 - 3211: Flat glass production
 - 3221: Container glass production
 - 3229: Pressed and blown glass production
 - 3296: Mineral wool production
 - (4) The furnace does not produce molten glass.
- (b) This source is not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60.110, 60.110a and 60.110b, Subparts K, Ka and Kb) because each storage tank containing volatile material, such as gasoline or diesel fuel, has a capacity less than 40 cubic meters.
- (c) This source is not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60.40, 60.40a, 60.40b and 60.40c, Subparts D, Da, Db and Dc) because each boiler has a capacity less than 10 million British thermal units per hour and was constructed prior to June 9, 1989.
- (d) The requirements of the National Emission Standards for Hazardous Air Pollutants, 326 IAC 14, (40 CFR 63.460, Subpart T) is not applicable to the one (1) solvent parts cold cleaner because it does not use halogenated solvents.
- (e) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 326 IAC 20; 40 CFR Part 61 and 40 CFR Part 63) applicable to this source.

State Rule Applicability - Entire Source

326 IAC 2-6 (Emission Reporting)

This source is subject to 326 IAC 2-6 (Emission Reporting), because it is located in Lake County and has the potential to emit more than ten (10) tons per year of NO_x. Pursuant to this rule, the owner/operator of the source must annually submit an emission statement for the source. The annual statement must be received by April 15 of each year and contain the minimum requirement as specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8) (Emission Statement Operating Year).

326 IAC 5-1 (Opacity Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary alternative opacity limitations), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of twenty percent (20%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

326 IAC 6-1-11.1 (Nonattainment area particulate limitations; Lake County fugitive particulate matter control requirements)

This source has a potential to emit less than 5 tons per year of fugitive particulate matter and this source is not listed in 326 IAC 6-1-11.1(a)(2). Therefore, the requirements of this rule are not applicable.

326 IAC 6-1-11.2 (Nonattainment area particulate limitations; Lake County particulate matter contingency measures)

This source is located in Lake County and listed in 326 IAC 6-1-10.1(d). Therefore, the requirements of 326 IAC 6-1-11.2 are applicable. There are no limitations in this rule; however, the source must comply with contingency measures if there is an exceedance of the twenty-four (24) hour PM₁₀ air quality standard.

26 IAC 6-4 (Fugitive Dust Emissions)

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions).

326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations)

This source is located in Lake County. Therefore, the requirements of 326 IAC 6-5 are not applicable.

State Rule Applicability - Individual Facilities

326 IAC 2-4.1-1 (New Source Toxics Control)

This source will emit levels of air toxics less than those which constitute a major source according to Section 112 of the 1990 Clean Air Act Amendments. Therefore, the requirements of 326 IAC 2-4.1-1, New Source Toxics Control, are not applicable.

326 IAC 6-1 (Nonattainment area particulate limitations)

- (a) Although the PM emissions are less than 10 tons per year from the one (1) EVC backup generator, which is not specified by 326 IAC 6-1-7. The source is mentioned in 326 IAC 6-1-7 and the PM from the source can be 10 tons per year or more. Therefore, the requirements of 326 IAC 6-1-2 are applicable to the one (1) EVC backup generator. The PM from the one (1) EVC backup generator shall not exceed 0.03 grain per dry standard cubic foot.
- (b) The requirements of 326 IAC 6-1-2 are applicable to the eight (8) sodium silicate solution storage tanks and handling operations, identified as EU-10, nineteen (19) Ludox colloidal silica storage tanks and handling operations, identified as EU-11, and ten (1) storage tanks containing inorganic chemicals with negligible vapor pressures. Because these are fugitive emissions which cannot exhaust through a stack, a grain loading limitation is not practical for these facilities. Therefore, the facilities will comply with 326 IAC 5-1 and 326 IAC 6-4, as will the entire source.
- (c) The filter bags controlling the lime transfer and storage operations, identified as EU-07, sand transfer and storage operations, identified as EU-08, and soda ash transfer and storage operations, identified as EU-09, shall not allow or permit discharge to the atmosphere of any gases which contain PM in excess of 0.03 grain per dry standard cubic foot. The PM not captured by the filter bags is fugitive, and the facilities will comply with 326 IAC 5-1 and 326 IAC 6-4, as will the entire source.

326 IAC 6-1-10.1 (Nonattainment area particulate limitations: Lake County PM₁₀ emission requirements)

- (a) Pursuant to 326 IAC 6-1-10.1(d), this W.R. Grace and Co. - Conn. source, which was formerly an EI DuPont source, shall comply with the following PM₁₀ and total suspended particulate (TSP) emission limitations:

The sodium silicate furnace shall limit PM₁₀ emissions to 1.439 pounds per ton and 6.0 pounds per hour. The PM₁₀ emission factor for the sodium silicate furnace is 0.772 pounds per ton, which is less than 1.439 pounds per ton. The potential to emit PM₁₀ is 3.7 pounds per hour (16.2 tons/year x 2,000 lbs/ton / 8,760 hours/year = 3.70 lbs/hour), which is less than 6.0 pounds per hour. Therefore, the sodium silicate furnace will comply with this rule. Since compliance is based on emissions testing from March 1993, the source will be required to test for PM and PM₁₀ between 30 and 36 months of issuance of this permit and once every five (5) years thereafter.

- (b) Pursuant to 326 IAC 6-1-10.1(h), each combustion unit in the Powerhouse shall fire natural gas only. These combustion units are as follows:
 - (1) The one (1) powerhouse backup generator
 - (2) The three (3) Stone Johnston boilers

As a result of the limitation in the type of fuel used, the emissions listed in 326 IAC 6-1-10.1(h) were 0.003 pound of particulate matter per million British thermal units and 0.100 pound of particulate matter per hour. Due to the change in the natural gas emission factors, the PM emissions will be 0.002 pound per MMBtu and the PM₁₀ emissions will be 0.008 pound per million British thermal units per hour, based on the current emission factors of 1.9 pounds of PM per million cubic feet of natural gas and 7.6 pounds of PM₁₀ per million cubic feet of natural gas. The one (1) backup generator in the powerhouse has the potential to emit 0.148 pound of PM per hour and 0.593 pound of PM₁₀ per hour according to the current AP-42 emission factors. Each boiler has PM emissions of 0.049 pounds per hour and PM₁₀ emissions of 0.198 pounds per hour according to the current AP-42 emission factors.

- (c) Pursuant to 326 IAC 6-1-10.1(l), a continuous compliance plan (CCP) is required for the one (1) sodium silicate furnace with uncontrolled PM₁₀ emissions that amount to ten (10) tons per year or more. The source submitted a CCP for the sodium silicate furnace on December 10, 1993. The CCP meets the requirements of 326 IAC 6-1-10.1(m) and (n). The source shall also comply with the requirements of 326 IAC 6-1-10.1(s), (t), (u) and (v), which outline the requirements for maintaining the CCP and complying with this rule. A CCP is not required for the three (3) Stone Johnson boilers because they can only burn natural gas.

326 IAC 7-1.1-1 (Sulfur dioxide emission limitations: applicability)

Since the potential to emit SO₂ is less than twenty-five (25) tons per year and ten (10) pounds per hour, the requirements of 326 IAC 7-1.1 are not applicable.

326 IAC 7-4-1.1 (Sulfur dioxide emission limitations: Lake County)

The one (1) furnace, three (3) boilers and two (2) generators only burn natural gas and are not subject to 326 IAC 7-1.1. Therefore, the source will comply with the requirements of 326 IAC 7-4-1.1.

326 IAC 8-3-2 (Organic Solvent Degreasing Operations: Cold Cleaner Operation)

The requirements of 326 IAC 8-3-2 are applicable to all cold cleaner degreasers constructed after January 1, 1980, performing organic solvent degreasing operations anywhere in the state. Pursuant to this rule, the owner or operator of a cold cleaning facility must:

- (a) Equip the cleaner with a cover;
- (b) Equip the cleaner with a facility for draining cleaned parts;
- (c) Close the degreaser cover whenever parts are not being handled in the cleaner;
- (d) Drain cleaned parts for at least fifteen (15) seconds or until dripping ceases;
- (e) Provide a permanent, conspicuous label summarizing the operation requirements;
- (f) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, in such a manner that greater than twenty percent (20%) of the waste solvent (by weight) can evaporate into the atmosphere.

The cold cleaner at this source will comply with this rule.

326 IAC 8-3-5 (Organic Solvent Degreasing Operations: Cold Cleaner Degreaser Operation and Control)

The requirements of 326 IAC 8-3-5 are applicable to all cold cleaner degreasers without remote solvent reservoirs constructed after January 1, 1990. The owner or operator of a cold cleaner degreaser facility must:

- (a) Ensure that the following control equipment requirements are met:
 - (1) Equip the degreaser with a cover. The cover must be designed so that it can be easily operated with one (1) hand if:
 - (A) The solvent volatility is greater than two (2) kiloPascals (fifteen (15) millimeters of mercury or three-tenths (0.3) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF));
 - (B) The solvent is agitated; or
 - (C) The solvent is heated.
 - (2) Equip the degreaser with a facility for draining cleaned articles. If the solvent volatility is greater than four and three-tenths (4.3) kiloPascals (thirty-two (32) millimeters of mercury or six-tenths (0.6) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF)), then the drainage facility must be internal such that articles are enclosed under the cover while draining. The drainage facility may be external for applications where an internal type cannot fit into the cleaning system.
 - (3) Provide a permanent, conspicuous label which lists the operating requirements outlined in subsection (b).
 - (4) The solvent spray, if used, must be a solid, fluid stream and shall be applied at a pressure which does not cause excessive splashing.
 - (5) Equip the degreaser with one (1) of the following control devices if the solvent volatility is greater than four and three-tenths (4.3) kiloPascals (thirty-two (32) millimeters of mercury or six-tenths (0.6) pounds per square inch) measured at thirty-eight degrees Celsius (38EC) (one hundred degrees Fahrenheit (100EF)), or if the solvent is heated to a temperature greater than forty-eight and nine-tenths degrees Celsius (48.9EC) (one hundred twenty degrees Fahrenheit (120EF)):
 - (A) A freeboard that attains a freeboard ratio of seventy-five hundredths (0.75) or greater.
 - (B) A water cover when solvent is used is insoluble in, and heavier than, water.
 - (C) Other systems of demonstrated equivalent control such as a refrigerated chiller or carbon adsorption. Such systems shall be submitted to the U.S. EPA as a SIP revision.

- (b) Ensure that the following operating requirements are met:
- (1) Close the cover whenever articles are not being handled in the degreaser.
 - (2) Drain cleaned articles for at least fifteen (15) seconds or until dripping ceases.
 - (3) Store waste solvent only in covered containers and prohibit the disposal or transfer of waste solvent in any manner in which greater than twenty percent (20%) of the waste solvent by weight could evaporate.

Compliance with this rule also ensures compliance with 326 IAC 8-3-2.

Conclusion

The operation of this sodium silicate solution and Ludox manufacturing plant shall be subject to the conditions of the attached proposed Minor Source Operating Permit 089-8847-00310.

Appendix A: Emissions Calculations

Page 1 of 4 Addendum App A

Natural Gas Combustion Only

MM BTU/HR <100

Two (2) backup generators

Company Name: W.R. Grace and Co. - Conn.

Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312

MSOP: 089-8847

Plt ID: 089-00310

Reviewer: CarrieAnn Ortolani

Date: March 9, 2001

Heat Input Capacity
MMBtu/hr

1.0

Sulfur Content
(%)

0.5

| | Pollutant | | | | | |
|-------------------------------|-----------|--------|---------------------|-------|-------|-------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/MMBtu | 0.0193 | 0.0419 | 0.470 (0.94 x s) | 0.440 | 0.024 | 0.11 |
| Potential Emission in tons/yr | 0.085 | 0.184 | 2.06 | 1.93 | 0.105 | 0.482 |

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

Emission Factors are from AP 42, Chapter 3.1, Table 3.1-2, SCC #2-01-002-01

Emission (tons/yr) = Throughput (MMBtu/hr) x Emission Factor (lb/MMBtu)*8,760 hrs/yr /2,000 lb/ton

Appendix A: Emissions Calculations

Page 1 of 4 Addendum App A

Natural Gas Combustion Only

MM BTU/HR <100

Two (2) backup generators

Company Name: W.R. Grace and Co. - Conn.

Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312

MSOP: 089-8847

Plt ID: 089-00310

Reviewer: CarrieAnn Ortolani

Date: March 9, 2001

Heat Input Capacity
MMBtu/hr

1.0

Sulfur Content
(%)

0.5

| | Pollutant | | | | | |
|-------------------------------|-----------|--------|---------------------|-------|-------|-------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/MMBtu | 0.0193 | 0.0419 | 0.470 (0.94 x s) | 0.440 | 0.024 | 0.11 |
| Potential Emission in tons/yr | 0.085 | 0.184 | 2.06 | 1.93 | 0.105 | 0.482 |

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

Emission Factors are from AP 42, Chapter 3.1, Table 3.1-2, SCC #2-01-002-01

Emission (tons/yr) = Throughput (MMBtu/hr) x Emission Factor (lb/MMBtu)*8,760 hrs/yr /2,000 lb/ton

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Three (3) Stone Johnston Boilers

Page 2 of 4 Addendum App A

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: March 9, 2001

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

79.4

695.4

| Emission Factor in lb/MMCF | Pollutant | | | | | |
|-------------------------------|-----------|-------|-------|-------------|------|------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| | 1.9 | 7.6 | 0.6 | 100.0 | 5.5 | 84.0 |
| Potential Emission in tons/yr | 0.661 | 2.64 | 0.209 | **see below | 1.91 | 29.2 |

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).

See page 3 for HAPs emissions calculations.

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Three (3) Stone and Johnston Boilers
HAPs Emissions

Page 3 of 4 Addendum App A

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: March 9, 2001

HAPs - Organics

| Emission Factor in lb/MMcf | Benzene 2.1E-03 | Dichlorobenzene 1.2E-03 | Formaldehyde 7.5E-02 | Hexane 1.8E+00 | Toluene 3.4E-03 |
|-------------------------------|--------------------|----------------------------|-------------------------|-------------------|--------------------|
| Potential Emission in tons/yr | 7.30E-04 | 4.17E-04 | 2.61E-02 | 6.26E-01 | 1.18E-03 |

HAPs - Metals

| Emission Factor in lb/MMcf | Lead 5.0E-04 | Cadmium 1.1E-03 | Chromium 1.4E-03 | Manganese 3.8E-04 | Nickel 2.1E-03 |
|-------------------------------|-----------------|--------------------|---------------------|----------------------|-------------------|
| Potential Emission in tons/yr | 1.74E-04 | 3.82E-04 | 4.87E-04 | 1.32E-04 | 7.30E-04 |

Methodology is the same as page 2.

The five highest organic and metal HAPs emission factors are provided above.
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emissions Calculations
Bulk Loading and Unloading and Material Transfer

Page 4 of 4 Addendum App A

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: March 9, 2001

Lime

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 0.056 | 0.02 | 1.12E-03 | 4.91E-03 | 70.0% | 95.0% | 3.75E-04 | 1.64E-03 |
| PM-10 | 0.056 | 0.0024 | 1.34E-04 | 5.89E-04 | 70.0% | 95.0% | 4.50E-05 | 1.97E-04 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 0.056 | 0.029 | 1.62E-03 | 7.11E-03 | 70.0% | 95.0% | 5.44E-04 | 2.38E-03 |
| PM-10 | 0.056 | 0.0064 | 3.58E-04 | 1.57E-03 | 70.0% | 95.0% | 1.20E-04 | 5.26E-04 |

Sand

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 4.2 | 0.02 | 0.084 | 0.368 | 70.0% | 95.0% | 2.81E-02 | 1.23E-01 |
| PM-10 | 4.2 | 0.0024 | 0.010 | 0.044 | 70.0% | 95.0% | 3.38E-03 | 1.48E-02 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 4.2 | 0.029 | 0.122 | 0.533 | 70.0% | 95.0% | 4.08E-02 | 1.79E-01 |
| PM-10 | 4.2 | 0.0064 | 0.027 | 0.118 | 70.0% | 95.0% | 9.00E-03 | 3.94E-02 |

Soda Ash

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 2.2 | 0.02 | 0.044 | 0.193 | 70.0% | 95.0% | 1.47E-02 | 6.46E-02 |
| PM-10 | 2.2 | 0.0024 | 0.005 | 0.023 | 70.0% | 95.0% | 1.77E-03 | 7.75E-03 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 2.2 | 0.029 | 0.064 | 0.279 | 70.0% | 95.0% | 2.14E-02 | 9.36E-02 |
| PM-10 | 2.2 | 0.0064 | 0.014 | 0.062 | 70.0% | 95.0% | 4.72E-03 | 2.07E-02 |

| | PTE before Control (lbs/hr) | PTE before Control (tons/yr) | PTE after Control (lbs/hr) | PTE after Control (tons/yr) |
|-----------------|-----------------------------------|------------------------------------|----------------------------------|-----------------------------------|
| LIME | | | | |
| PM | 2.74E-03 | 1.20E-02 | 9.19E-04 | 4.03E-03 |
| PM-10 | 4.93E-04 | 2.16E-03 | 1.65E-04 | 7.23E-04 |
| SAND | | | | |
| PM | 2.06E-01 | 9.01E-01 | 2.81E-02 | 1.23E-01 |
| PM-10 | 3.70E-02 | 1.62E-01 | 3.38E-03 | 1.48E-02 |
| SODA ASH | | | | |
| PM | 1.08E-01 | 4.72E-01 | 3.61E-02 | 1.58E-01 |
| PM-10 | 1.94E-02 | 8.48E-02 | 6.49E-03 | 2.84E-02 |
| TOTAL | | | | |
| PM | 0.316 | 1.39 | 0.106 | 0.464 |
| PM-10 | 0.057 | 0.249 | 0.019 | 0.083 |

SCC#s 3-05-025-06 and 3-05-025-03

Appendix A: Emissions Calculations**Natural Gas Combustion****MM BTU/HR <100****One (1) Sodium Silicate Furnace**

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

Potential Throughput
Tons/hr

25.0

219.0

4.8

| | Pollutant | | | | | |
|-------------------------------|---|-------|-------|-------|-------|------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/MMCF | combined w/ process emission factors | 0.772 | 0.6 | 100.0 | 5.5 | 84.0 |
| Emission Factor in lbs/ton | | | | | | |
| Potential Emission in tons/yr | 16.3 | 16.2 | 0.066 | 11.0 | 0.602 | 9.20 |

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

Note: PM and PM-10 emission factors are calculated from the 1993 stack test data.

(3.1157 lbs PM/hr / 8,037 lbs solution/hr x 2,000 lbs/ton of solution = 0.775 lbs PM / ton of solution)

(0.775 lbs PM / ton of solution x 99.59% PM-10 = 0.772 lbs PM10/ ton of solution)

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See page 2 for HAPs emissions calculations.

Appendix A: Emissions Calculations**Natural Gas Combustion Only****MM BTU/HR <100****One (1) sodium silicate furnace****HAPs Emissions**

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Plt ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

HAPs - Organics

| Emission Factor in lb/MMcf | Benzene 2.1E-03 | Dichlorobenzene 1.2E-03 | Formaldehyde 7.5E-02 | Hexane 1.8E+00 | Toluene 3.4E-03 |
|-------------------------------|--------------------|----------------------------|-------------------------|-------------------|--------------------|
| Potential Emission in tons/yr | 2.30E-04 | 1.31E-04 | 8.21E-03 | 1.97E-01 | 3.72E-04 |

HAPs - Metals

| Emission Factor in lb/MMcf | Lead 5.0E-04 | Cadmium 1.1E-03 | Chromium 1.4E-03 | Manganese 3.8E-04 | Nickel 2.1E-03 |
|-------------------------------|-----------------|--------------------|---------------------|----------------------|-------------------|
| Potential Emission in tons/yr | 5.48E-05 | 1.20E-04 | 1.53E-04 | 4.16E-05 | 2.30E-04 |

Methodology is the same as page 1.

The five highest organic and metal HAPs emission factors are provided above.

Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Three (3) Stone Johnston Boilers

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

78.0

683.3

| Emission Factor in lb/MMCF | Pollutant | | | | | |
|-------------------------------|-----------|-------|-------|-------------|------|------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| | 1.9 | 7.6 | 0.6 | 100.0 | 5.5 | 84.0 |
| | | | | **see below | | |
| Potential Emission in tons/yr | 0.649 | 2.60 | 0.205 | 34.2 | 1.88 | 28.7 |

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).

See page 4 for HAPs emissions calculations.

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Three (3) Stone and Johnston Boilers
HAPs Emissions

Page 4 of 8 TSD App A

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Plt ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

HAPs - Organics

| Emission Factor in lb/MMcf | Benzene 2.1E-03 | Dichlorobenzene 1.2E-03 | Formaldehyde 7.5E-02 | Hexane 1.8E+00 | Toluene 3.4E-03 |
|-------------------------------|--------------------|----------------------------|-------------------------|-------------------|--------------------|
| Potential Emission in tons/yr | 7.17E-04 | 4.10E-04 | 2.56E-02 | 6.15E-01 | 1.16E-03 |

HAPs - Metals

| Emission Factor in lb/MMcf | Lead 5.0E-04 | Cadmium 1.1E-03 | Chromium 1.4E-03 | Manganese 3.8E-04 | Nickel 2.1E-03 |
|-------------------------------|-----------------|--------------------|---------------------|----------------------|-------------------|
| Potential Emission in tons/yr | 1.71E-04 | 3.76E-04 | 4.78E-04 | 1.30E-04 | 7.17E-04 |

Methodology is the same as page 3.

The five highest organic and metal HAPs emission factors are provided above.
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Two (2) backup generators

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Plt ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

1.0

8.8

| Emission Factor in lb/MMCF | Pollutant | | | | | |
|-------------------------------|-----------|-------|-------|-------------|-------|-------|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| | 1.9 | 7.6 | 0.6 | 100.0 | 5.5 | 84.0 |
| Potential Emission in tons/yr | 0.008 | 0.033 | 0.003 | **see below | 0.024 | 0.368 |

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).

See page 6 for HAPs emissions calculations.

Appendix A: Emissions Calculations**Natural Gas Combustion Only****MM BTU/HR <100****Two (2) backup generators****HAPs Emissions****Company Name: W.R. Grace and Co. - Conn.****Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312****MSOP: 089-8847****Plt ID: 089-00310****Reviewer: CarrieAnn Ortolani****Date: August 6, 1997****HAPs - Organics**

| Emission Factor in lb/MMcf | Benzene 2.1E-03 | Dichlorobenzene 1.2E-03 | Formaldehyde 7.5E-02 | Hexane 1.8E+00 | Toluene 3.4E-03 |
|-------------------------------|--------------------|----------------------------|-------------------------|-------------------|--------------------|
| Potential Emission in tons/yr | 9.20E-06 | 5.26E-06 | 3.29E-04 | 7.88E-03 | 1.49E-05 |

HAPs - Metals

| Emission Factor in lb/MMcf | Lead 5.0E-04 | Cadmium 1.1E-03 | Chromium 1.4E-03 | Manganese 3.8E-04 | Nickel 2.1E-03 |
|-------------------------------|-----------------|--------------------|---------------------|----------------------|-------------------|
| Potential Emission in tons/yr | 2.19E-06 | 4.82E-06 | 6.13E-06 | 1.66E-06 | 9.20E-06 |

Methodology is the same as page 5.

The five highest organic and metal HAPs emission factors are provided above.

Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emissions Calculations
Bulk Loading and Unloading and Material Transfer

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Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

Lime

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 0.056 | 0.02 | 1.12E-03 | 4.91E-03 | 70.0% | 95.0% | 3.75E-04 | 1.64E-03 |
| PM-10 | 0.056 | 0.0024 | 1.34E-04 | 5.89E-04 | 70.0% | 95.0% | 4.50E-05 | 1.97E-04 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 0.056 | 0.029 | 1.62E-03 | 4.71E-05 | 70.0% | 95.0% | 5.44E-04 | 2.38E-03 |
| PM-10 | 0.056 | 0.0064 | 3.58E-04 | 2.29E-06 | 70.0% | 95.0% | 1.20E-04 | 5.26E-04 |

Sand

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 4.2 | 0.02 | 0.084 | 0.368 | 70.0% | 95.0% | 2.81E-02 | 1.23E-01 |
| PM-10 | 4.2 | 0.0024 | 0.010 | 0.044 | 70.0% | 95.0% | 3.38E-03 | 1.48E-02 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 4.2 | 0.029 | 0.122 | 0.004 | 70.0% | 95.0% | 4.08E-02 | 1.79E-01 |
| PM-10 | 4.2 | 0.0064 | 0.027 | 0.0002 | 70.0% | 95.0% | 9.00E-03 | 3.94E-02 |

Soda Ash

Bulk Loading and Unloading

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 2.2 | 0.02 | 0.044 | 0.193 | 70.0% | 95.0% | 1.47E-02 | 6.46E-02 |
| PM-10 | 2.2 | 0.0024 | 0.005 | 0.023 | 70.0% | 95.0% | 1.77E-03 | 7.75E-03 |

Material Transfer and Conveying

| | Throughput (tons/hr) | Emission Factor (lbs/ton) | Potential Emissions (lbs/hr) | Potential Emissions (tons/yr) | Capture Efficiency (%) | Control Efficiency (%) | Emissions after Control (lbs/hr) | Emissions after Control (tons/yr) |
|-------|-------------------------|---------------------------------|------------------------------------|-------------------------------------|------------------------------|------------------------------|--|---|
| PM | 2.2 | 0.029 | 0.064 | 0.002 | 70.0% | 95.0% | 2.14E-02 | 9.36E-02 |
| PM-10 | 2.2 | 0.0064 | 0.014 | 0.0001 | 70.0% | 95.0% | 4.72E-03 | 2.07E-02 |

| | PTE before Control (lbs/hr) | PTE before Control (tons/yr) | PTE after Control (lbs/hr) | PTE after Control (tons/yr) |
|-----------------|-----------------------------------|------------------------------------|----------------------------------|-----------------------------------|
| LIME | | | | |
| PM | 2.74E-03 | 4.95E-03 | 9.19E-04 | 4.03E-03 |
| PM-10 | 4.93E-04 | 5.91E-04 | 1.65E-04 | 7.23E-04 |
| SAND | | | | |
| PM | 2.06E-01 | 3.71E-01 | 2.81E-02 | 1.23E-01 |
| PM-10 | 3.70E-02 | 4.43E-02 | 3.38E-03 | 1.48E-02 |
| SODA ASH | | | | |
| PM | 1.08E-01 | 1.95E-01 | 3.61E-02 | 1.58E-01 |
| PM-10 | 1.94E-02 | 2.32E-02 | 6.49E-03 | 2.84E-02 |
| TOTAL | | | | |
| PM | 0.316 | 0.571 | 0.106 | 0.464 |
| PM-10 | 0.057 | 0.068 | 0.019 | 0.083 |

SCC#s 3-05-025-06 and 3-05-025-03

Appendix A: Emissions Calculations
Sodium Silicate and LUDOX Storage and Handling

Company Name: W.R. Grace and Co. - Conn.
Address City IN Zip: 5215 Kennedy Avenue, East Chicago, Indiana 46312
MSOP: 089-8847
Pit ID: 089-00310
Reviewer: CarrieAnn Ortolani
Date: August 6, 1997

Sodium Silicate

| Maximum | Solution Produced (MMlbs/yr) | Weight % Water (%) | Density Solution (lbs/gal) | Sodium silicate Product (gallons/yr) | Sodium silicate Product (cuft/yr) | Vapor Pressure (mm Hg) | Temperature (deg F) | Moles of Vapors @ std. (lb mole/yr) | Moles of Vapors @ actual (lb mole/yr) | Molecular Weight Water (lb/lb mole) | PM Emissions Generated (lbs/yr) | PM Emissions Generated (tons/yr) | PM Emissions Generated (lbs/hr) |
|---------|------------------------------|--------------------|----------------------------|--------------------------------------|-----------------------------------|------------------------|---------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|
| | 300.34 | 72.0% | 11.7 | 25670085 | 3431600 | 34 | 130 | 9557 | 356.5 | 18.02 | 6425 | 3.21 | 0.733 |

LUDOX

| Maximum | LUDOX Produced (MMlbs/yr) | Weight % Water (%) | Density Solution (lbs/gal) | LUDOX Product (gallons/yr) | LUDOX Product (cuft/yr) | Vapor Pressure (mm Hg) | Temperature (deg F) | Moles of Vapors @ std. (lb mole/yr) | Moles of Vapors @ actual (lb mole/yr) | Molecular Weight Vapor Mixture (lb/lb mole) | Total Emissions Generated (lbs/yr) | Total Emissions Generated (tons/yr) | Total Emissions Generated (lbs/hr) |
|---------|---------------------------|--------------------|----------------------------|----------------------------|-------------------------|------------------------|---------------------|-------------------------------------|---------------------------------------|---|------------------------------------|-------------------------------------|------------------------------------|
| | 68 | 50.0% | 11.7 | 5811966 | 776949 | 24 | 77 | 2164 | 62.6 | 21.98 | 1376 | 0.688 | 0.157 |

| Weight % Ethylene glycol in LUDOX | Weight % Formaldehyde | Ethylene glycol Emissions (tons/yr) | Formaldehyde Emissions (tons/yr) | Resultant PM Emissions (lbs/hr) | Resultant PM Emissions (tons/yr) |
|-----------------------------------|-----------------------|-------------------------------------|----------------------------------|---------------------------------|----------------------------------|
| 9.00% | 5.00% | 0.062 | 0.034 | 0.135 | 0.592 |

Methodology

Product (gallons/yr) = Product (MMlbs/yr) * 1000000 / Density of Solution

Product (cuft/yr) = Product (gallons/yr) / 7.4805 gallons/cuft

Moles of vapor at standard temperature and pressure (lb mole/yr) = Product (cuft/yr) / 359.05 cuft/ lb mole (one mole of ideal gas at 0 degrees C and 760 mm Hg)

Moles of vapor at actual temperature and pressure (lb mole/yr) = Moles of vapor at standard temperature and pressure (lb mole/yr) * actual vapor pressure * standard temperature (R) / (standard pressure * actual temperature (R))

Emissions generated (lbs/yr) = moles of vapor at actual temperature and pressure (lb mole/yr) * volatile molecular weight (lb/lb mole) including water

Emissions from sodium silicate solution are only condensible PM because only water is volatile.

Emissions from LUDOX are condensible PM, ethylene glycol and formaldehyde.

Ethylene glycol emissions from LUDOX = Total emissions * weight percent ethylene glycol

Formaldehyde emissions from LUDOX = Total emissions * weight percent formaldehyde

PM emissions from LUDOX = Total emissions - (ethylene glycol emissions + formaldehyde emissions)